

collection of data relating to ice movements in which it may be possible in time to recognize some periodicity in occurrence.

RARE LUNAR HALO PHENOMENA

Mr. P. Connor, in charge of the United States Weather Bureau station at Kansas City, Mo., reports that at 8:20 p. m., April 16, 1924, a bright paraselene was observed on a segment of a 22° lunar halo for about 15 minutes. The colors presented by the paraselene varied from bright white to pink, the latter on the side next the moon. Between 2 and 3 a. m., on April 17, Mr. John Macy, of Woodston, Kans., observed a very bright paraselene circle and the upper half of the 22° halo, together with bright 22° and 120° paraselene; neither the halo nor the paraselene circle extended beyond their points of intersection; otherwise they were complete.

BALL LIGHTNING

The phenomenon of ball lightning is believed to have been observed by Mrs. R. V. Zimmerman at her home

about 10 miles northeast of Charles City, Iowa, at 9 p. m. March 28, 1924. Mr. E. G. Larson, in charge of the Charles City Weather Bureau office, transmits Mrs. Zimmerman's account of the phenomenon, which is substantially as follows:

On Friday evening, March 28, about 9 o'clock, I saw in the southwest a light which at first was thought to be a reflection from the electric lights of Charles City, but it seemed brighter than those lights. After watching it for a time, I called my 14-year-old daughter and we agreed that it might be a fire. The fire, if it were such, would rise and fall, then suddenly it shifted to one side for as much as a rod and started to come toward the house; as it kept coming closer, I again called my daughter and she again confirmed my impression. By this time it was almost to our lane and moving slower; it stopped in the road just outside the lane for perhaps a minute and a half or two minutes. It appeared to be a globe of white light about the size of an ordinary lantern globe. The light from it was reflected perhaps 3 rods, and it seemed to rest about 2 or 3 feet above the ground. By this time we were both thoroughly frightened. As quickly as it had come it began to recede to where it was first seen. We watched it for a short time longer; it would come toward us a little way and then recede—A. J. H.

BIBLIOGRAPHY

C. FITZHUGH TALMAN, Meteorologist in Charge of Library

RECENT ADDITIONS

The following have been selected from among the titles of books recently received as representing those most likely to be useful to Weather Bureau officials in their meteorological work and studies.

Beveridge, W. H.

British exports and the barometer. pt. 1-2. diagr. 24 $\frac{1}{2}$ cm. [pt. 1. Photostated: Economic journal, London, v. 30, March 1920. pt. 2. Repr.: Economic journal, London, v. 30, June 1920.]

Linke, Franz.

Ein Universalaktinometer. Leipzig. 1924. p. 59-82. illus. 27 cm. (Sonder-Ab.: Zeits. für. tech. Physik. Nr. 2, 1924.)

[Liverpool. University.]

Configuration and climate of northwest England. n. p. 1924. [7 p.] 25 $\frac{1}{2}$ cm. [Manifolded.]

Rainfall of southwest Scotland and the Solway district. [8 p.] figs. 25 $\frac{1}{2}$ cm. [Manifolded.]

MacIntire, W. H., & Young, J. B.

Sulfur, calcium, magnesium, and potassium content and reaction of rainfall at different points in Tennessee. p. 205-227. illus. 25 $\frac{1}{2}$ cm. (Repr.: Soil science, v. 15, no. 3, March, 1923.)

Moore, Henry Ludwell.

Origin of the eight-year generating cycle. 29 p. figs. 23 $\frac{1}{2}$ cm. (Repr.: Quart. journ. econ., v. 36, Nov., 1921.)

Olbright, K.

Klima und Entwicklung. Versuch einer Bioklimatik des Menschen und der Säugetiere. Jena. 1923. 74 p. plates (fold.) 24 $\frac{1}{2}$ cm.

Spitaler, Rudolf.

Aufzeichnungen des Anemometers im dritten Jahrfünft Jänner 1916 bis Dezember 1920. Windrichtung und Windgeschwindigkeit. Prag. 1923. 115 p. tables. 32 cm.

Uberi, Guglielmo degli.

Che tempo farà. Meteorologia pratica alla portata di tutti per prevedere, a breve o lunga scadenza, quali saranno le condizioni del cielo, del mar, dell'atmosfera . . . Roma. 1924. 128 p. illus. 16 cm.

RECENT PAPERS BEARING ON METEOROLOGY AND SEISMOLOGY

The following titles have been selected from the contents of the periodicals and serials recently received in the Library of the Weather Bureau. The titles selected are of papers and other communications bearing on meteorology and cognate branches of science. This is not a complete index of all the journals from which it has been compiled. It shows only the articles that appear to the compiler likely to be of particular interest in connection with the work of the Weather Bureau.

France. Académie des sciences. Comptes rendus. Paris. t. 178. 1924.

Gabriel, Jules. Sur la périodicité des orages. p. 1020-1022. (17 mars.)

Gorczyński, Ladislas. Sur un pyrhéliomètre thermo-électrique à lecture directe ou enregistreur. p. 1200-1201. (31 mars.)

Boutaric, A. Sur le rayonnement de l'atmosphère. p. 1303-1304. (7 avril.)

Nodon, Albert. Relations entre le magnétisme et l'état de l'atmosphère. p. 1378-1379. (14 avril.)

Meteorologische Zeitschrift. Braunschweig. Band 41. März 1924.

Conrad, V. M. Bäumler, Das gleichzeitige Auftreten luftelektrischer Störungen. p. 97-98.

Friedmann, A., & Tamarkin, J. Über eine Methode der Bestimmung der vertikalen Windgeschwindigkeit. p. 90-91.

Hellmann, G. "Serein" ist Beschlag. p. 98.

Hellmann, G. Temperaturmessungen nahe dem Meerestrande p. 91-93.

Kofler. Wissenschaftliche Erforschung der Atmosphäre. p. 94-96. [Abstracts of papers published by Moscow aerological observatory.]

Kofler. Zwanzigjährige Messungen der Sonnenstrahlung in Warschau. p. 96-97.

Linke, Franz. Die angeblichen Schwankungen der Solarkonstanten. p. 74-78.

Markgraf, H. Gesetzmäßigkeiten der luftelektrischen Elemente in Potsdam. p. 65-71.

Maurer, H. Tägliche Periode der Regendauer in Potsdam und Batavia. p. 86-88.

Maurer, J. Die strengen Winter Süddeutschlands und der Schweiz, bewertet nach den grossen Seegefrörnen seit 1400. p. 85-86.

Meyer, R. Arbeiten des III. Kongresses der Russischen Assoziation von Physikern in Nischni-Nowgorod vom 17. bis 22 September 1922. p. 88-90.

Das physikalisch-meteorologische Observatorium Prof. Dr. C. Dorno, Davos. p. 81-85.

Range, Paul. Über neuere meteorologische Beobachtungen auf der Sinaihalbinsel. p. 79-81.

Sü[ring]. Koelzer, Einfluss von Temperatur und Wind auf die Schallausbreitung in der Atmosphäre. p. 93-94.

Wiedenhoff, S. Ionenzahlmessungen an der Versuchsfunkstelle Strelitz(Alt-). 72-73.

Reale accademia dei Lincei. Atti. Roma. Rendiconti. v. (5)33, fasc. 2. 1924.

Grabolovitz, Giulio. Legge armonica di propagazione dei telesismi. p. 74-76.

Royal aeronautical society. Journal. London. v. 159. March, 1924.

Scott, G. H., & Richmond, V. C. A detailed consideration of the effect of meteorological conditions on airships. p. 189-221.

- Royal meteorological society. Quarterly journal. London. v. 49. October, 1923.*
 Benest, E. E. Note on the "Sumatras" of the Malacca Straits. p. 237-238.
 Brooks, C. E. P. Meteorological observations at El Peru, Venezuela. p. 229-230.
 Clark, J. Edmund, & Margary, Ivan D. Report on the phenological observations in the British Isles, from December 1921 to November 1922. p. 239-272.
 Clayden, Arthur W. An improved actinograph. p. 231-235.
 Longstaff, T. G. Meteorological notes from the Mount Everest expedition of 1922. p. 273-276.
 Neame, P. An Alpine mirage. p. 278-280.
 Salter, M. de Carle S., & Glasspoole, J. The fluctuations of annual rainfall in the British Isles considered cartographically. p. 207-229.
 Sutton, L. J. Note on indoor temperatures in Cairo during the summer of 1922. p. 277-278.
- Royal society of London. Proceedings. London. ser. A. v. 105. March, 1924.*
 Brooks, C. E. P. The difference-periodogram—a method for the rapid determination of short periodicities. p. 346-359.
 Chree, C. Atmospheric pollution and potential gradient at Kew observatory, 1921 and 1922. p. 311-333.
- Società meteorologica italiana. Bollettino bimestrale. Torino. v. 44. Gennaio-marzo 1924.*
 Eredia, Filippo. Le divisioni dell' anno a seconda dei fenomeni meteorologici. p. 1-6.
 L'osservatorio meteorologico di Catanzaro. p. 10-11.

- Washington academy of sciences. Journal. Baltimore, Md. v. 14. March 4, 1924.*
 Dryden, H. L. The pressure of the wind. p. 121. [Abstract.]
 Gish, O. H. The system for recording earth-currents at the Watheroo Magnetic Observatory. p. 120. [Abstract.]
Weather & wireless magazine. Tunbridge Wells. v. 2. January, 1924.

- Hornier, Donald W. Clouds as weather prophets. p. 8-10.
 Hornier, Donald W. Seasonable weather lore. p. 1-4.
 Smith, R. J. A few notes on the climate of India. 1. Rain-fall. p. 11-12.
Wetter. Berlin. 40. Jahrgang. Okt./Nov./Dez. 1923.
 Dr. O. Stoll, ein Pionier deutscher Wissenschaft. p. 126. [Obituary.]
 Grosse, W. Atmosphärische Störung und Beobachtungen von Sonnenschein und Bewölkung. p. 120-121.
 Grosse, W. Sonnenflecken und Witterung. p. 116-119.
 Naegler, W. Klima- und Vegetationskalender für Leipzig. p. 121-124.
 Peppier, Albert. Professor Dr. Otto Freybe. p. 98-100. [Obituary.]
 Peppier, W. Isallobare, Luftdruckwellen und Witterungsperioden. p. 100-103.
 Rolf, Bruno. Bemerkungen zu dem Aufsatz von W. Walsch: "Die 'örtlich' mögliche Sonnenscheindauer." p. 126-127.
 Troeger, Heinz. Die Begriffe "kühl" und "schwül." p. 124-126.
 Vercelli, Francesco. Neue Versuche über meteorologische Voraussagen. p. 103-108.

SOLAR OBSERVATIONS

SOLAR AND SKY RADIATION MEASUREMENTS DURING APRIL, 1924

By HERBERT H. KIMBALL, In Charge, Solar Radiation Investigations

For a description of instruments and exposures and an account of the method of obtaining and reducing the measurements, the reader is referred to the REVIEW for January and February, 1924, 53: 42 and 113.

From Table 1 it is seen that solar radiation intensities averaged close to normal values for April at all three stations.

Table 2 shows that the total solar and sky radiation received on a horizontal surface averaged close to normal at Washington; below normal at Madison, and above normal at Lincoln.

Skylight polarization measurements made on 8 days at Washington give a mean of 58 per cent, with a maximum of 62 per cent on the 23d. Measurements obtained on 2 days at Madison give a mean of 64 per cent, with a maximum of 69 per cent on the 18th. These are slightly above the average April values at the respective stations.

TABLE 1.—Solar radiation intensities during April, 1924

[Gram-calories per minute per square centimeter of normal surface]

Washington, D. C.

Date	Sun's zenith distance										
	Sa.m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°	Noon
	75th mer. time	Air mass									Local mean solar time
	e	5.0	4.0	3.0	2.0	11.0	2.0	3.0	4.0	5.0	e
Apr. 2	mm.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	mm.	
3	2.74					1.41	1.09	0.90		2.87	
5	3.45		0.61	0.80	1.01	1.33	1.20	0.98	0.75	0.54	
7	5.36										5.79
8	3.81	0.75	0.83	0.93							3.81
11	3.63										3.45
19	4.87										4.57
21	3.99	0.73	0.86	1.01	1.18						4.48
22	9.47										3.30
23	3.81	0.69	0.80	0.90	1.16	1.39	0.74				3.63
24	4.75										5.79
25	7.04										4.57
26	4.75										4.17
Means		0.71	0.74	0.88	1.06	1.38	1.06	0.92	(0.78)	(0.62)	
Departures		+0.01	-0.01	±0.00	-0.01	+0.02	-0.02	+0.02	+0.04	+0.03	

TABLE 1.—Solar radiation intensities during April, 1924—Contd.
Madison, Wis.

Date.	Sun's zenith distance.										Noon.
	Sa.m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°	Local mean solar time
	75th mer. time.	Air mass.									
	e.	5.0	4.0	3.0	2.0	11.0	2.0	3.0	4.0	5.0	e.
Apr. 2	mm.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	mm.	
9	2.74										3.99
10	4.17										4.37
12	3.45										3.63
14	5.36										3.45
18	3.81										5.79
23	6.78										6.78
29											
Means											
Departures											
		(1.12)									
		+0.03									
		±0.02									
		±0.02									

Date.	Lincoln, Nebr.										
	Apr. 1	2.26			1.17	1.32	1.51	1.24	1.07	0.94	0.84
	2	4.17			0.69	0.98	1.20	1.52			5.56
	7	5.56	0.64	0.73	0.94						6.27
Apr.	9	3.63				1.13	1.28	1.52			2.62
	14	9.83	0.77	0.88	1.03	1.21	1.44	1.12	0.98	0.78	0.65
	15	9.83			0.88	1.02	1.18				8.18
	17	3.81			0.77	1.03	1.31				9.14
	18	4.17	0.86	0.97	1.18	1.33	1.51				2.06
	22	3.81			0.89						3.00
	23	4.37			0.65	0.87	1.29				3.63
	24	11.38			0.82						7.57
	28	6.02	0.71	0.79	0.95	1.13	1.40	1.24	1.07	0.93	12.68
	30	6.02									7.57
Means					0.74	0.82	0.98	1.20	1.45	1.20	0.88
Departures					-0.02	-0.02	-0.02	-0.02	±0.00	+0.02	+0.05
									+0.04	+0.07	

¹ Extrapolated.

TABLE 2.—Solar and sky radiation received on a horizontal surface.

Week beginning—	Average daily radiation					Average daily departure from normal		
	Washington	Madison	Lincoln	Chicago	New York	Washington	Madison	Lincoln
	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.
1924								
Apr. 2	458	383	525	340		+67	+5	+88
9	381	479	560	335		-36	+86	+126
16	356	289	561	232	1 250	-67	-123	+120
23	560	301	424	237	506	+122	-132	-33
Excess or deficiency since first of year on Apr. 29						+1,410	-3,592	+846

¹ Six days only.